

3/2/18 "A mistake is food for a new invention." -Anonymous

HW: "Domain Algebraically" w/s  
Test 2 on Friday 3/9

AIM: How do we find Domain Algebraically?

Warm Up:

1) What situations do we have restrictions on the values that x can be?

1) When we have an x in the denominator.

Ex:  $\frac{4}{x+2} \quad x \neq -2$

2) When we have "x" under a radical

ex:  $\sqrt{x} \quad x \text{ cannot be negative}$   
 $x \geq 0$

Situations in which  
the domain is not "all real numbers"

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1) Fraction: Set denominator  $\neq 0$   
and solve.

⊗ This will show us what x cannot be.  
 $\frac{1}{x} \quad x \neq 0$

2) Radical: Set radicand (what is under radical symbol)  
to be  $\geq 0$  and solve.  
 $\sqrt{x} \quad x \geq 0$

3) Fraction with a radical in the denominator:

Set radicand  $> 0$  and solve

Ex:  $\frac{1}{\sqrt{x}} \quad x > 0$

## II. Find the domain of each

1.  $y = \frac{1}{x-3}$

Domain is  $x \neq 3$ 

$$\begin{array}{r} x-3 \neq 0 \\ +3 \quad +3 \\ \hline x \neq 3 \end{array}$$

SB:  $x < 3$  or  $x > 3$ Int:  $(-\infty, 3) \cup (3, \infty)$ 

2.  $y = \frac{5}{x^2-4}$

Alt:

$$\begin{array}{l} x^2-4 \neq 0 \\ x^2 \neq 4 \\ x \neq \pm 2 \end{array}$$

$$\begin{array}{l} x^2-4 \neq 0 \\ (x+2)(x-2) \neq 0 \\ x \neq -2 \quad x \neq 2 \end{array}$$

Domain:

$x \neq \pm 2$

5.  $y = \sqrt{x-5}$

$$\begin{array}{r} x-5 \geq 0 \\ +5 \quad +5 \\ \hline x \geq 5 \end{array}$$

Domain:

SB:  $\{x \mid x \geq 5\}$

Int:  $[5, \infty)$

6.  $y = \frac{5}{\sqrt{x-3}}$

⊗ Combo

$$\begin{array}{r} x-3 > 0 \\ +3 \quad +3 \\ \hline x > 3 \end{array}$$

Domain:

SB:  $\{x \mid x > 3\}$

Int:  $(3, \infty)$

11)  $y = \frac{x+1}{5}$

Domain:

All Real #s

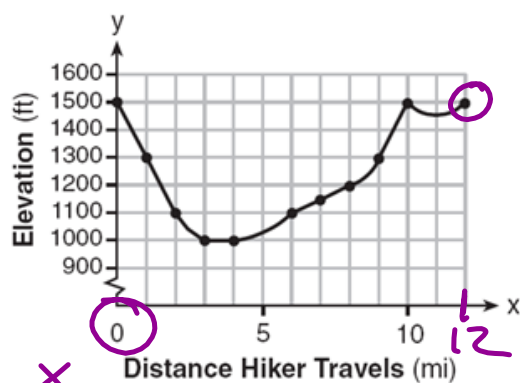
12)  $y = x^2 + 3x + 2$

Domain:

All Reals

III.

- 1) The accompanying graph shows the elevation of a certain region in New York State as a hiker travels along a trail.



What is the domain of this function?

(1)  $1,000 \leq x \leq 1,500$

~~(2)  $1,000 \leq y \leq 1,500$~~

(3)  $0 \leq x \leq 12$

~~(4)  $0 \leq y \leq 12$~~